

## Studies on the Anderemaeidae J. Balogh, 1972 (Acari, Oribatei)

By

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**Abstract.** Three new *Anderemaeus* species (*A. capitatus*, *A. sturmi* and *A. forsteri* spp. n.) are described. The genus *Yungaseremaeus* BALOGH & MAHUNKA, 1969 is transferred from the family Oppiidae to the family Anderemaeidae. Identification keys to the genera and species of the family Anderemaeidae are added.

The genus *Anderemaeus* was described by HAMMER (1958, p. 62) from Bolivia. She collected two specimens east of Cumbre (4000 m) and three ones at Chacaltaya (north of La Paz, about 4900 m), all on very low cushions of different plants (bryophytes, grasses). The species collected here got the name *Anderemaeus monticola* HAMMER, 1958.

BALOGH and CSISZÁR (1963) studied several specimens of *A. monticola* HAMMER, 1958 and *A. chilensis* HAMMER, 1962 collected by TOPÁL (1963) in the province Rio Negro of the Argentine.

Similarly HAMMER (1962, p. 53 – 54) described two further species: *Anderemaeus chilensis* HAMMER, 1962, found on three specimens from Puerto Montt and *A. magellanicus* HAMMER, 1962 found on five specimens from the environs of Punta Arenas and from Tierra del Fuego. Also here the localities were low cushions of bryophytes and grasses.

7 specimens of the next species, *Anderemaeus hammerae* MAHUNKA, 1980 were collected by E. HORÁK (Zurich) from the Monte Susanna near Ushuaia. The specimens were found in the humid litter of *Nothofagus pumilio*, at the timberline, at height of 460 m.

Found on our examinations, we join three further ones to the 4 *Anderemaeus* species described so far. *Anderemaeus capitatus* sp. n. was found at 3700 m height in Columbia among the dead leaves of *Espeletia hartwegiana*; *Anderemaeus sturmi* sp.n. in the páramo zone of the Bogotá district. The real surprise, however, was meant by *Anderemaeus forsteri* sp.n., which the authors identified from Berlese samples collected in New Zealand. While investigating the New Zealand soil fauna, FORSTER and coworkers collected a number of highly interesting Arthropoda, among them spiders (Araneae) in recent years. Part of these species are related to those of Tierra del Fuego and of the South American Andes.

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Similar results were brought by HAMMER's examinations in the oribatid mites of New Zealand (HAMMER, 1966, 1968). On the basis of HAMMER's research work, 350 oribatid species are known from New Zealand, so this country belongs among the most thoroughly explored ones in oribatidological respect. It seems that in spite of this, still further new species can be expected. It can be said that, relying on the species known today, the range of the genus *Anderemaeus* largely coincides with the upper limit of the *Nothofagus* region and with the páramo vegetation.

The range of the second genus of the Anderemaeidae family, of *Cristeremaeus* BALOGH & CSISZÁR, 1962, is similar. 13 specimens of the species *Cristeremaeus humeratus* BALOGH & CSISZÁR, 1962 were collected by TOPÁL in the province Chubut of the Argentine, near Lago Espejo at height of 1000 m in *Nothofagus antarctica* forest from moss on bark and in soil; 2 specimens of the species *Cristeremaeus clavatus* MAHUNKA, 1980 were collected by HORÁK near Ushuaia, in Monte Susanna from the humid litter of *Nothofagus pumilio*.

The only species of the genus *Yungaseremaeus* BALOGH & MAHUNKA, 1969, *Y. longisetosus* BALOGH & MAHUNKA, 1969, was collected by the authors in one specimen in Bolivia between Coroico and Unduavi, at a height of about 2200 m, from living and dead moss. The genus can be understood as an extremely shaped branch of the *Anderemaeus* line of development.

The authors range the genus *Carabodoides* JACOT, 1937 with the family Anderemaeidae with some hesitation. The habitus of the 4 species belonging here are rather different from those of the preceding three genera. Also the geographic range of the species (West Africa, Cuba, Amazonia) utterly differs from those of the preceding ones.

#### *Keys to the genera of Anderemaeidae*

- 1 (2) Legs monodactyle.

***Cristeremaeus* BALOGH & CSISZÁR, 1963**

- 2 (1) Legs tridactylous.

- 3 (4) Shoulder without humeral appendage; notogaster each with 2 crista; notogastral setae penicillate.

***Carabodoides* JACOT, 1937**

- 4 (3) Shoulder with humeral appendage; notogaster without crista; notogastral setae smooth or very finely ciliate.

- 5 (6) 4 pairs of notogastral setae (*t*<sub>1</sub>, *t*<sub>2</sub>, *m*<sub>5</sub> and *r*<sub>3</sub>) very long, ciliate, the remaining ones short.

***Yungaseremaeus* BALOGH & MAHUNKA, 1969**

- 6 (5) 8–9 pairs of notogastral setae longer; the remaining (*la*, *p*<sub>1</sub>) short.

***Anderemaeus* HAMMER, 1958**

#### *Cristeremaeus* BALOGH & CSISZÁR, 1963

- 1 (2) Sensillus long, setiform. — The Argentine: Chubut.

***humeratus* BALOGH & CSISZÁR, 1962**

- 2 (1) Sensillus short, with fusiform head and with a sharp apex. — The Argentine: Tierra del Fuego.

***clavatus* MAHUNKA, 1980**

*Carabodoides* JACOT, 1937

- 1 (2) Interlamellar setae setiform, smooth or very finely ciliate. — West Africa.

*laticeps* BALOGH, 1963

- 2 (1) Interlamellar setae penicillate, plumose or elongately ciliate.

- 3 (6) Setae  $p_2$  and  $p_3$  plumose.

- 4 (5) Notogaster with polygonally arranged granulation. — North America.  
*saccharomycetoides* JACOT, 1937

- 5 (4) Notogaster with scattered granulation. — Cuba.

*granulatus* BALOGH & MAHUNKA, 1979

- 6 (3) Setae  $p_2$  and  $p_3$  setiform, minute, smooth.

- 7 (8) External crista straight, long, traversing between setae  $te$  and  $ti$  and becoming obsolete before setae  $r_3$  and  $ms$ . — Brazil.

*longicarinatus* BALOGH & MAHUNKA, 1978

- 8 (7) External crista essentially shorter, considerably obsolescent in front of setae  $te$  and  $ti$ . — Brazil.

*brasiliensis* BALOGH & MAHUNKA, 1969

*Anderemaeus* HAMMER, 1958

- 1 (4) Sensillus capitate with medium-long or short stalk.

- 2 (3) Behind each of setae  $in$  a chitinous arch; behind each of setae  $ta$  a chitinous crest; notogaster granulate. — Columbia.

*capitatus* sp. n.

- 3 (2) Behind the setae  $in$  and  $ta$  no chitinous arch or crest; notogaster foveolate. — The Argentine: Tierra del Fuego.

*hammerae* MAHUNKA, 1980

- 4 (1) Sensillus setiform, rod-like or slight fusiform; never with capitate head.

- 5 (6) Notogastral setae very long, curved with flagellate end; costulae with translamellar connexion. — New Zealand.

*forsteri* sp. n.

- 6 (5) Notogastral setae short or medium long, never curved and with flagellate end.

- 7 (8) Setae  $p_1$  extremely short; setae  $ti$  and  $ms$  longer than the distance between setae  $ti$  and  $ms$ . — Columbia.

*sturmi* sp. n.

- 8 (7) Setae  $p_1$  only a little shorter than setae  $r_1$ ; setae  $ti$  and  $ms$  shorter than the distance between setae  $ti$  and  $ms$ .

- 9 (10) Notogastral setae with pointed end. — Bolivia.

*monticola* HAMMER, 1958

- 10 (9) Notogastral setae slightly thicker towards the tip.

11 (12) Behind the interlamellar setae there are two right-angled ridges. — Chile: Puerto Montt.

*chilensis* HAMMER, 1962

12 (11) No right-angled ridges behind the interlamellar setae. — Chile: Tierra del Fuego.

*magellanicus* HAMMER, 1962

*Yungaseremaeus* BALOGH & MAHUNKA, 1969

Unique species. — Bolivia.

*longisetosus* BALOGH & MAHUNKA, 1969

*Anderemaeus capitatus* sp. n.

(Fig. 1A–D)

Length: 746–812  $\mu\text{m}$ , breadth: 513–533  $\mu\text{m}$ .

Prodorsum: Sensillus capitate, with granulate head and with a short stalk. Setae *in* long, erectile, with short scattered cilia. Setae *le* and *ro* short, thin. Costulae slightly convergent. Extrabothrydial region granulated. There are two chitinous laths behind the setae *in*.

Notogaster: There is a protruding humeral extension on each shoulder, characteristic of the genus. 10 pairs of notogastral setae. Setae *ta* shorter than the remaining notogastral ones; except of one pair of posteromarginal setae (probably the setae  $p_1$ ) which are short and curved. There is a chitinous rib each behind the humeral extension. Notogaster with fine, granulate cerotegument.

Ventral side: 6 pairs of genital\*, 1 pair of aggenital, 2 pairs of anal, 3 pairs of adanal setae; all very short and fine. Pori *iad* in apoanal position. Setae  $ad_1$  in postanal,  $ad_2$  and  $ad_3$  in adanal position.

Material examined: Columbia, Páramo del Huila, 30. VII. 1878, about 3700 m, *Espeletia hartwigiana*, dead leaves, Berlese sample, 1 holotype, 1 paratype.

Remarks: Only one *Anderemaeus* bears a capitate sensillus: *A. hammerae* MAHUNKA, 1980 (Tierra del Fuego), but the sensillus of this species has much longer stalk, the notogastral setae are shorter and the setae  $p_1$  only a little shorter than the  $r_1$  ones.

*Anderemaeus sturmi* sp. n.

(Fig. 2A–D)

Length: 718–720  $\mu\text{m}$ , breadth: 492–541  $\mu\text{m}$ .

Prodorsum: Sensillus long, filiform, apically not dilatated, smooth. Setae *in* medium long, erectile, sparsely ciliated. Setae *le* and *ro* short, smooth, thin. Costulae convergent. There are two chitinous tubercles behind the setae *in*.

Notogaster: Humeral extension present on each shoulder. 10 pairs of notogastral setae. Setae *ta* shorter than setae *te* and *ti*. Setae  $p_1$  very short. Notogastral setae on the apical half ciliated.

\* The first two of the genital setae are unfortunately omitted on the Fig. 1 B.

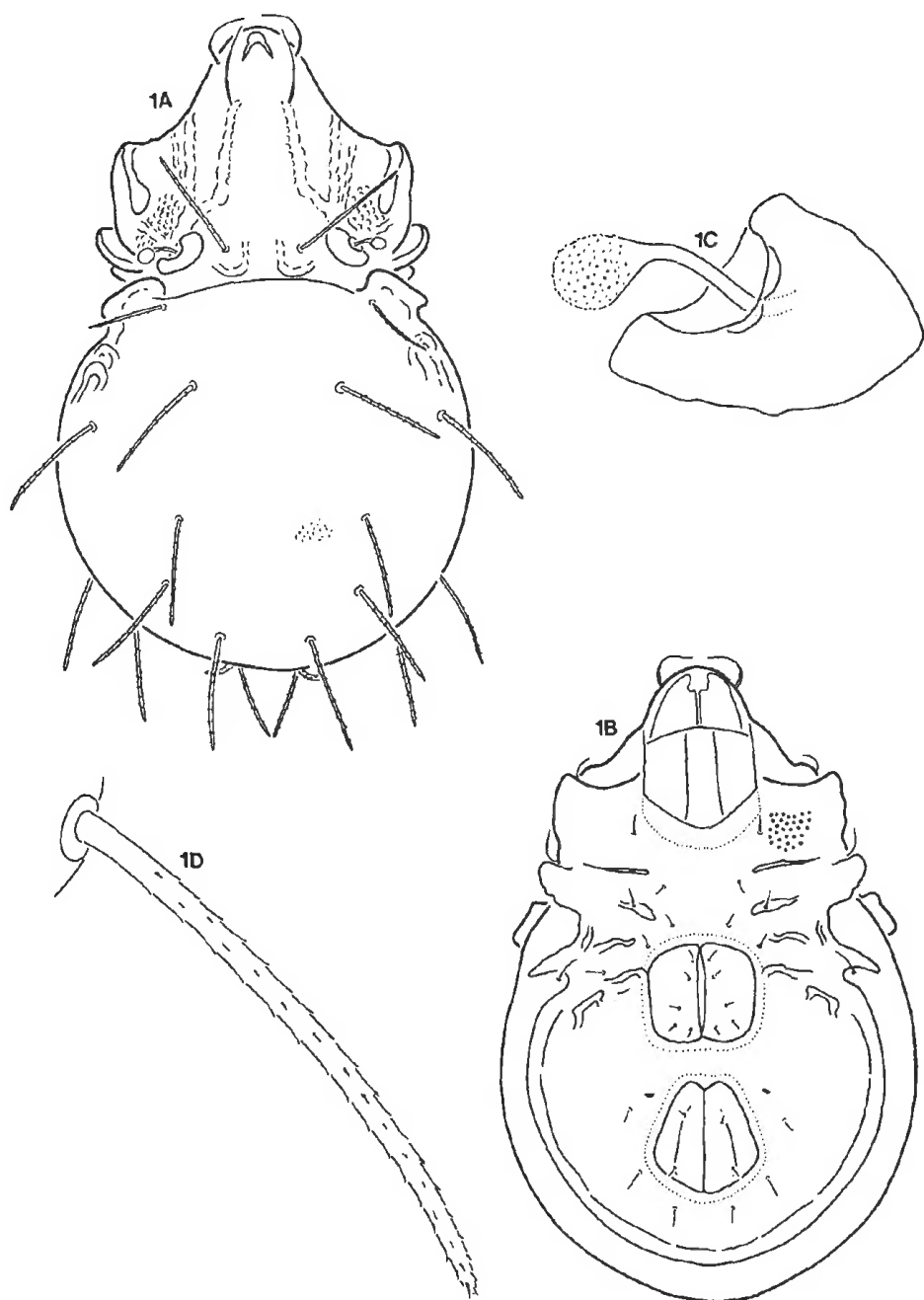


Fig. 1. *Anderemaeus capitatus* sp. n. A: dorsal side; B: ventral side; C: sensillus; D: notogastral seta



Fig. 2. *Anderemaeus sturmi* sp. n. A: dorsal side; B: ventral side; C: sensillus; D: notogastral seta

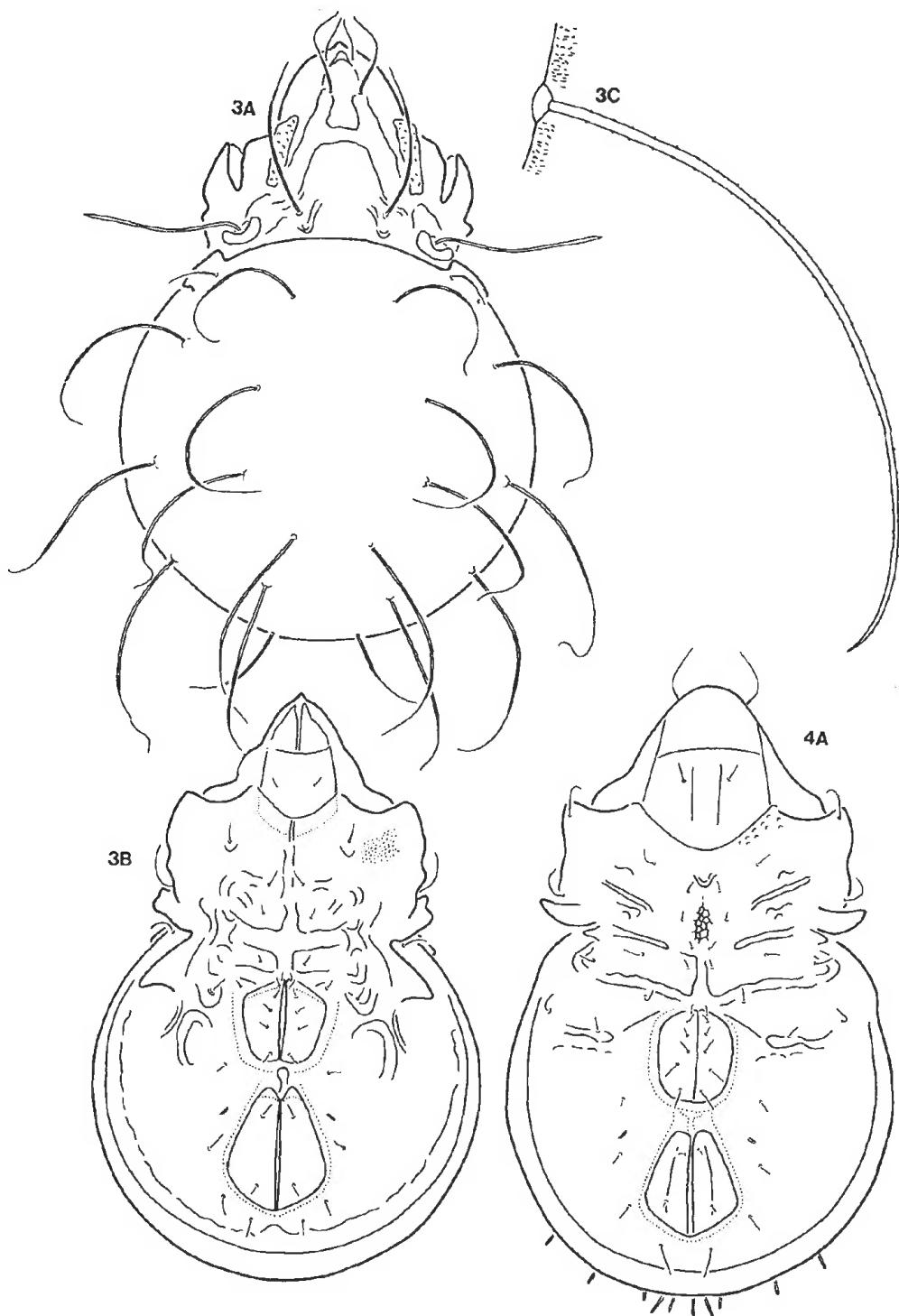


Fig. 3. *Anderemaeus forsteri* sp. n. A: dorsal side, B: ventral side; C: notogastral seta. — Fig. 4. *Yungaseremaeus longisetosus* BALOGH & MAHUNKA, 1969. A: ventral side

Ventral side: 6 pairs of genital, 1 pair of aggenital, 2 pairs of anal, 3 pairs of adanal setae, all very short and fine. Setae  $ad_1$  and  $ad_2$  in postanal,  $ad_3$  in adanal position. Pori *iad* apoanal.

Material examined: Columbia, Páramo de Monserrate, 7. III. 1960, 3200–3300 m, 1 holotype, 4 paratypes; Columbia, Iconzo, 5. I. 1968, Puente Natural, Middle Magdalena Valley, about 75 km SW from Bogotá, rest of an undisturbed forest, 3 paratypes; Columbia, Páramo de cocuy, 24. IX. 1978. in *Calamagrostis* soil, 1 paratype.

Remarks: Only *A. chilensis* HAMMER, 1962 (Chile, Puerto Montt) has long, bacilliform sensillus, but this species shows shorter and towards the tip, slightly thicker notogastral setae and its setae  $p_1$  are only a little shorter than setae  $r_1$ .

Dedicated to Prof. Dr. H. STURM, discoverer and investigator of the "Espeletia-fauna" of the Andian Páramo.

*Anderemaeus forsteri* sp. n.

(Fig. 3A–D)

Length: 812–836  $\mu\text{m}$ , breadth: 525–562  $\mu\text{m}$ .

Prodorsum: Sensillus long, rod-like, apically hardly fusiform, smooth. Setae *in* long, curved, setiform; setae *le* much shorter, setiform; setae *ro* shorter than setae *le*. Costulae converging, connected with a translamellar crest; the whole complex reminds of a letter H. There are two chitinous tubercles behind the setae *in*.

Notogaster: Humeral extension present. 10 pairs of long, curved, apically flagellate setae: exception is the seta *ta*, which is short and setiform. Notogastral setae originating in a chitinous tubercle. Notogaster with thin cerotegument, composed of minute sticks.

Ventral side: Epimeral region with complicated chitinous structures, tubercles and enantiophyses. 6 pairs of genital, 1 pair of aggenital, 2 pairs of anal, 3 pairs of adanal setae. Setae  $p_1$  in postanal position. Pori *iad* apoanal, on the level of 1st pair of anal setae.

Material examined: New Zealand, Wharau, Wairara, 5. III. 1967, leg. C.L. WILTON; 1 holotype, 3 paratypes.

Remarks: The translamellar ridge, the long, flagellate notogastral setae are unique in the genus.

Dedicated to Mr. FORSTER, pioneer investigator of the soil fauna in New Zealand.

*Yungaseremaeus longisetosus* BALOGH & MAHUNKA, 1969

(Fig. 4A)

The study of the type material convicted the authors that this genus had to be removed to the family Anderemaeidae J. BALOGH, 1972. To the original description the drawing made now is a substantial proof that the species belongs in this family.